

**ABSTRACT OF THE DISCLOSURE**

A linearized thermal and optical model of an optical integrated circuit can be used to temperature-stabilize one or more optical elements of the circuit using active temperature regulation. To stabilize a single optical element, such as an arrayed waveguide grating (AWG), a temperature sensor and a heater can be provided proximate to the grating. Thermal and optical coefficients can be then used to select an appropriate temperature set-point for the temperature controller that receives readings from the sensor and determines the power dissipated in the heater. Multiple AWG's can be stabilized individually, using the same process and lumping cross-heating factors together with other environmental factors. Alternatively, multiple AWG's can be stabilized using fewer sensors than AWG's, by stabilizing one of the AWG's in the same manner as in the case of a single AWG, and determining power dissipated in the heaters of the remaining AWG's based on the linearized model.